ProFUSION embedded systems

The Linux Bluetooth Stack

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Agenda

ProFUSION embedded systems

- What's Bluetooth?
- What's BlueZ?
- Linux and The Bluetooth Stack
- L2CAP Extended Features
- Bluetooth 3.0 + High Speed
- Bluetooth Low Energy

What's Bluetooth

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- Use the unlicensed 2.4GHz ISM band
- Designed as a cable replacement
- Designed for short-distance data exchange
- Many uses cases (profiles)
- Specified by the Bluetooth SIG
- Low power, low cost

Bluetooth specifications

ProFUSION embedded systems

- Bluetooth 1.0 and 1.0b
    - first versions, many problems
- Bluetooth 1.1
    - fixed 1.0 problems
    - Ratified as IEEE standard
- Bluetooth 1.2
    - fast connection and discovery
    - eSCO, to improve audio links

Bluetooth specifications

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- Bluetooth 2.0 + EDR
- Bluetooth 2.1 + EDR
    - Secure Simple Pairing (SSP) - Bluetooth 2.1 addendum (Extended L2CAP)
- Bluetooth 3.0 + HS
- Bluetooth 4.0 (a.k.a. Low Energy)

All specification are backward compatible.

The Bluetooth Stack

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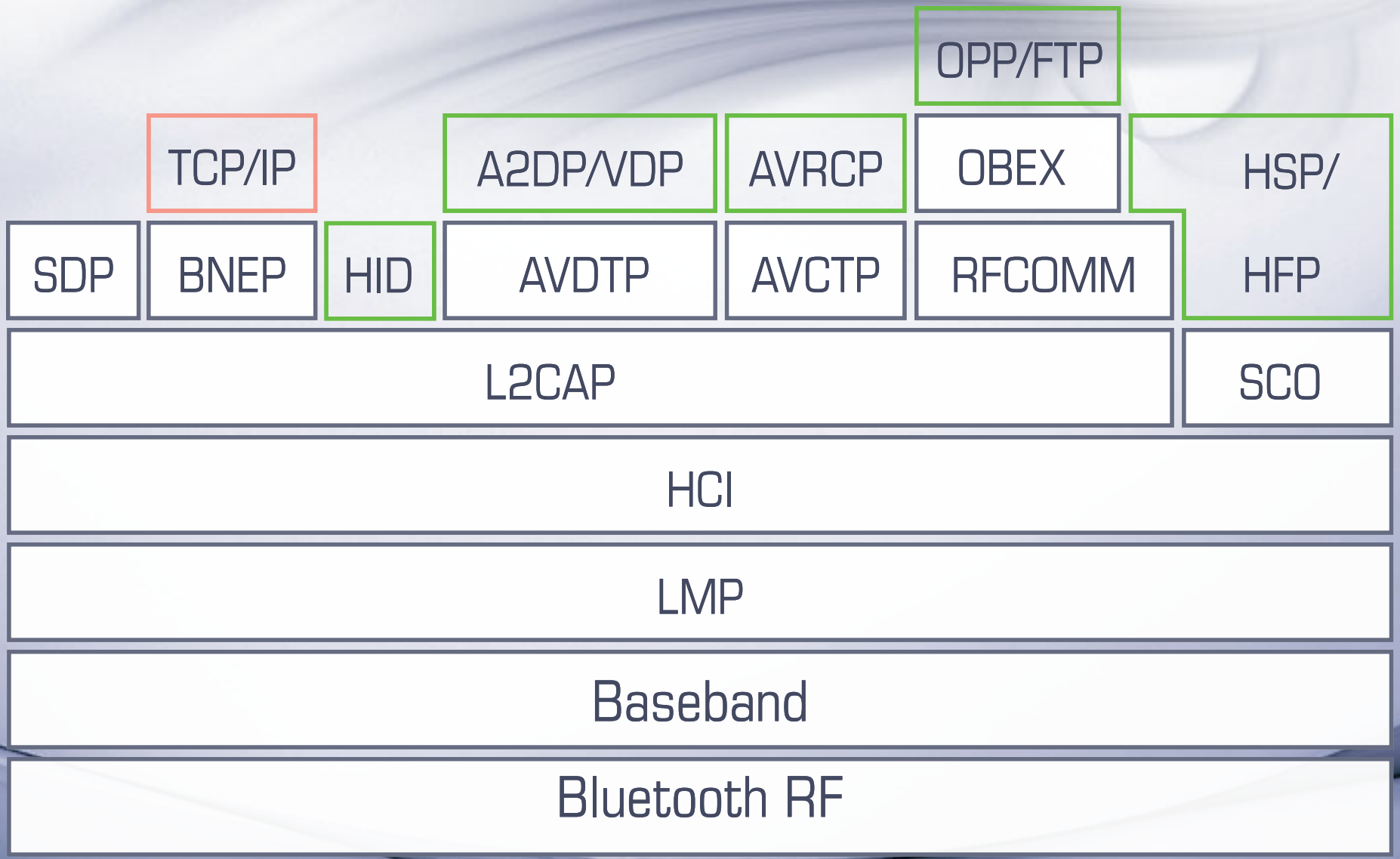

What's BlueZ

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- Official Linux Bluetooth Protocol Stack
- Project started in 2001 by Qualcomm
- Not planned for the final user
- D-Bus API
- Used by gnome-bluetooth, kbluetooth, gnome-phone-manager, BlueMaemo, etc

BlueZ features

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- Complete modular implementation
- Real hardware abstraction
- Support for multiple Bluetooth devices
- Device and service level security support
- Standard socket interface to all layers

Who develops BlueZ?

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Marcel Holtmann

Johan Hedberg

Luiz Augusto von Dentz

Gustavo F. Padovan

Claudio Takahasi

Vinícius Gomes

… and others

Linux and the Bluetooth Stack

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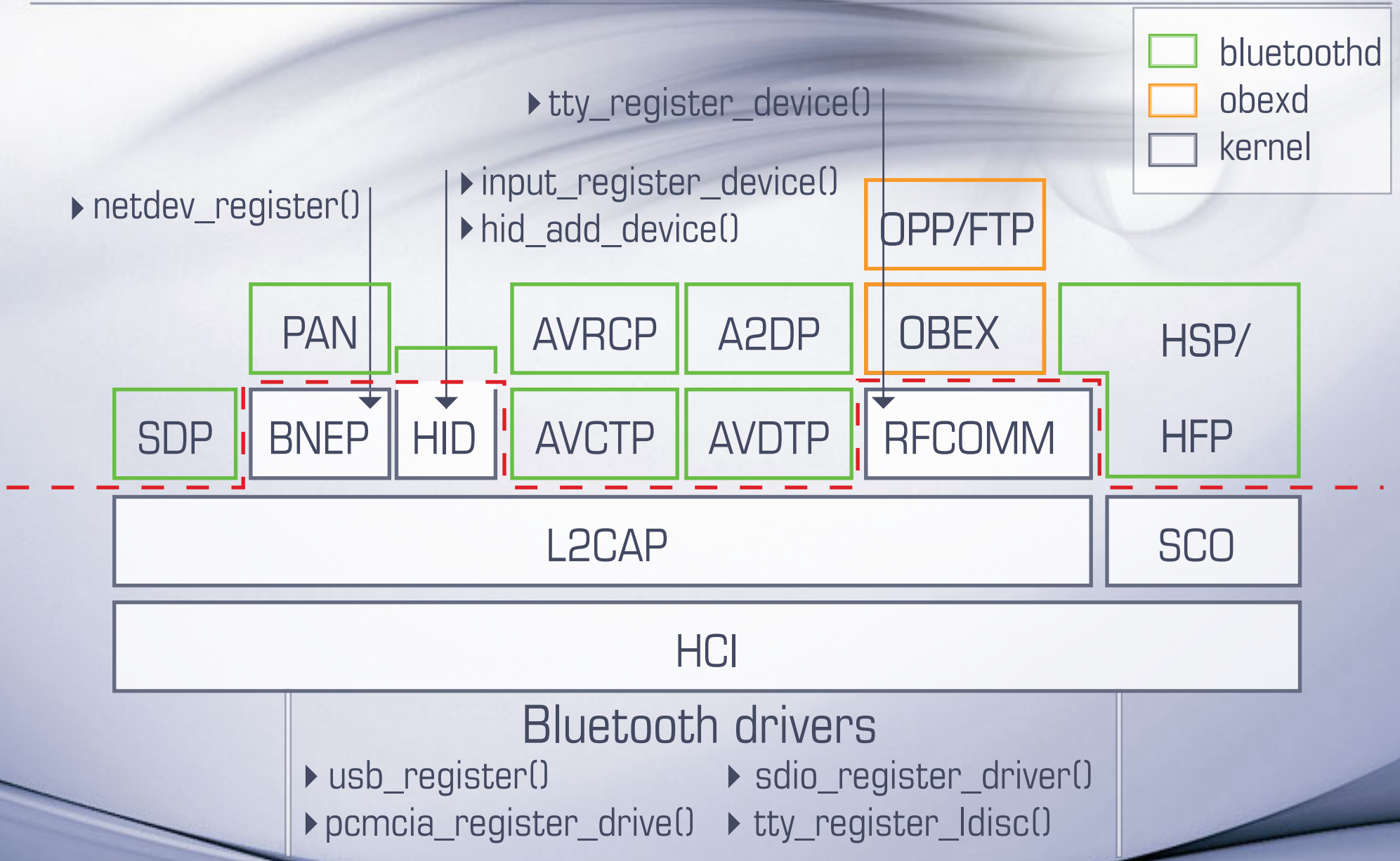

bluetoothd

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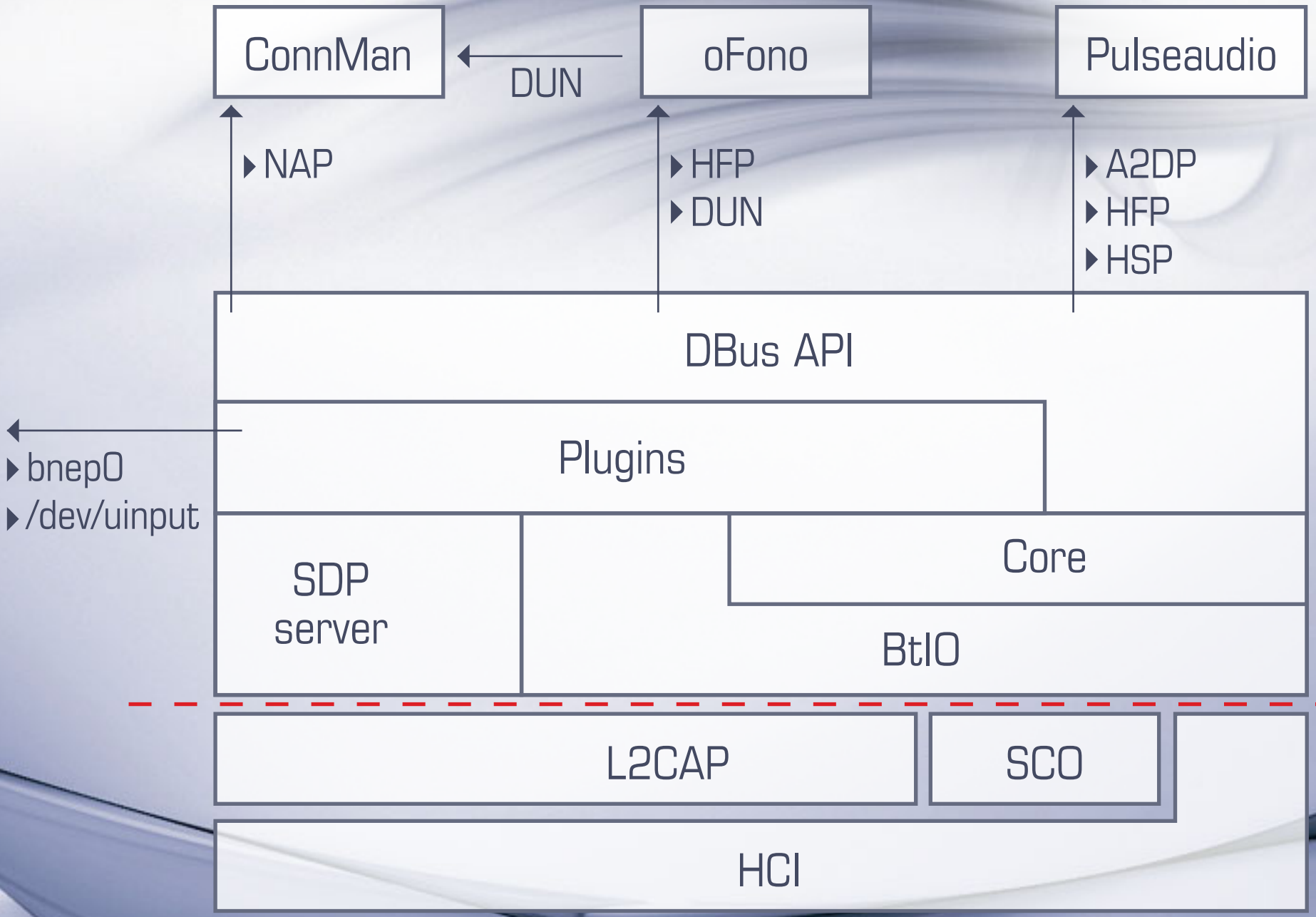

L2CAP extended features

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- Add segmentation and reassembly of L2CAP packets
- Add a reliable protocol (Enhanced Retransmission Mode)
- Add a streaming protocol (Streaming Mode)
- Add checksum (Frame Check Sequence)
- Needed by High Speed and Health Profiles

Bluetooth 3.0 + hs

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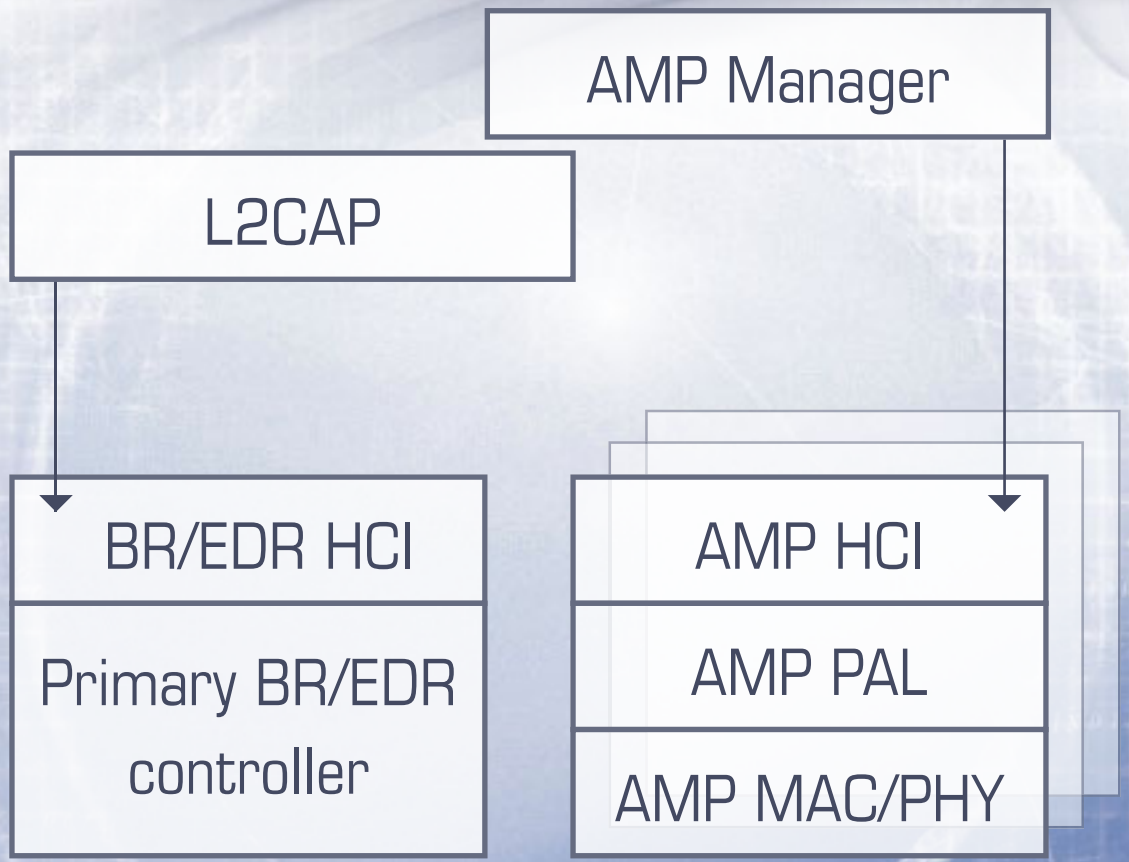
- Add support to use others radio like the 802.11
- Increase the Bluetooth transfer bandwidth
- Need a layer to translate HCI <-> mac80211
- Still need the BR/EDR radio

Bluetooth 3.0 + hs

ProFUSION embedded systems



Bluetooth 3.0 + hs on Linux

ProFUSION embedded systems

- Still under development
- Abstraction of the change of controller
- No visible changes for the user

Bluetooth 4.0

ProFUSION embedded systems

- a.k.a. Bluetooth Low Energy
- Add a new 2.4GHz radio
- Can be Single Mode or Dual Mode
- Can use the same radio for LE and BR/EDR
- Coin cell battery devices
- Exchange low amount of data

Bluetooth Low Energy on Linux

ProFUSION embedded systems

- Still under development
- Abstraction of the LE controller
- No visible changes for the user

The End!

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